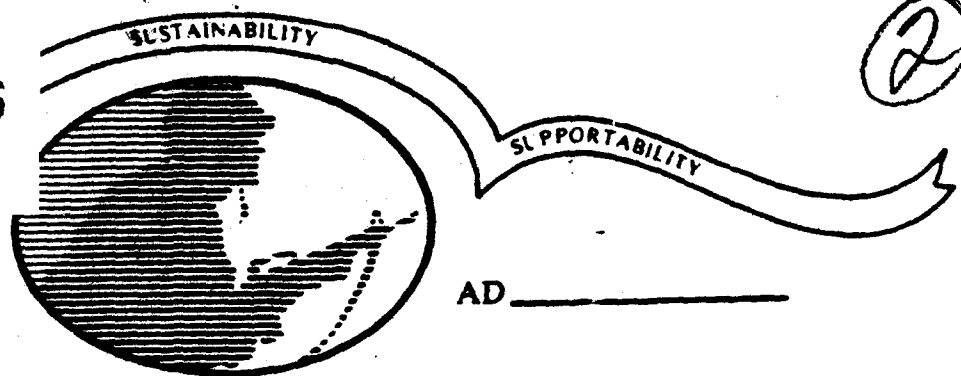


AD-A240 836



TECHNICAL REPORT
NATICK/TR-89/042



EVALUATION OF NEW LIQUID FOODS VIA FOCUS GROUPS

BY

JOAN KALICK
RICHARD POPPER

SEPTEMBER 1989
FINAL REPORT
JUNE 1988 - AUGUST 1989

91-11321



DTIC
ELECTE
SEP 26 1991
S B D

APPROVED FOR PUBLIC RELEASE;
DISTRIBUTION UNLIMITED

UNITED STATES ARMY NATICK
RESEARCH, DEVELOPMENT AND ENGINEERING CENTER
NATICK, MASSACHUSETTS 01760-5000

SCIENCE AND ADVANCED TECHNOLOGY DIRECTORATE

9 1 9 23 064

DISCLAIMERS

The findings contained in this report are not to be construed as an official Department of the Army position unless so designated by other authorized documents.

Citation of trade names in this report does not constitute an official endorsement or approval of the use of such items.

DESTRUCTION NOTICE

For Classified Documents:

Follow the procedures in DoD 5200.22-M, Industrial Security Manual, Section II-19 or DoD 5200.1-R, Information Security Program Regulation, Chapter IX.

For Unclassified/Limited Distribution Documents:

Destroy by any method that prevents disclosure of contents or reconstruction of the document.

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE

REPORT DOCUMENTATION PAGE

Form Approved
OMB No 0704 0188
Exp Date Jun 30 1986

1a REPORT SECURITY CLASSIFICATION UNCLASSIFIED			1b RESTRICTIVE MARKINGS		
2a SECURITY CLASSIFICATION AUTHORITY			3 DISTRIBUTION/AVAILABILITY OF REPORT Approved for public release; distribution is unlimited.		
2b DECLASSIFICATION/DOWNGRADING SCHEDULE					
4 PERFORMING ORGANIZATION REPORT NUMBER(S) NATICK/TR-89/042			5 MONITORING ORGANIZATION REPORT NUMBER(S)		
6a NAME OF PERFORMING ORGANIZATION U.S. Army Natick RD&E Center	6b OFFICE SYMBOL (If applicable) STRNC-YBH	7a NAME OF MONITORING ORGANIZATION			
6c ADDRESS (City, State, and ZIP Code) Natick, MA 01760-5020		7b ADDRESS (City, State, and ZIP Code)			
8a NAME OF FUNDING/SPONSORING ORGANIZATION	8b OFFICE SYMBOL (If applicable)	9 PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER			
8c ADDRESS (City, State, and ZIP Code)		10 SOURCE OF FUNDING NUMBERS			
		PROGRAM ELEMENT NO.	PROJECT NO. 1L162786AH99	TASK NO.	WORK UNIT ACCESSION NO. BB-169
11 TITLE (Include Security Classification) Evaluation of New Liquid Foods Via Focus Groups (Unclassified)					
12 PERSONAL AUTHOR(S) Joan Kalick and Richard Popper					
13a TYPE OF REPORT Final	13b TIME COVERED FROM Jun 88 to Aug 89	14 DATE OF REPORT (Year, Month, Day) 1989 September		15 PAGE COUNT 32	
16 SUPPLEMENTARY NOTATION					
17 COSATI CODES			18 SUBJECT TERMS (Continue on reverse if necessary and identify by block number)		
FIELD	GROUP	SUB-GROUP	FOODS HOSPITALS FOOD PREPARATION NUTRIENTS		
			LIQUID FOODS PATIENTS DIETS COOK-FREEZE		
			FLAVOR VISCOSITY MENUS		
19 ABSTRACT (Continue on reverse if necessary and identify by block number) Focus Group methodology was used in the assessment of 14 liquid foods to provide qualitative data not obtainable through traditional methods. Two focus groups were conducted with post-oral (UF) and current surgery patients who had intermaxillary fixation both with (IFS) and without (IF) splints. Patients were female volunteers ages 14-47. Three typical daily meals were sipped through straws during a single session. Respondents rated 8 sensory attributes and evaluated the liquid foods. IFS patients, perceived the liquid food as thicker and more bland than IF patients, perhaps because oral splints prevented food from reaching receptors in the mouth, thus reducing flavor intensity. IFS patients recommended thinner viscosity for easier consumption, adding more flavor, and reducing serving sizes to 4 oz, to reduce bloating. IF patients recommended more variety (continued)					
20 DISTRIBUTION AVAILABILITY OF ABSTRACT <input checked="" type="checkbox"/> UNCLASSIFIED/UNLIMITED <input type="checkbox"/> SAME AS RPT <input type="checkbox"/> DTIC USERS			21 ABSTRACT SECURITY CLASSIFICATION Unclassified		
22a NAME OF RESPONSIBLE INDIVIDUAL Joan Kalick			22b TELEPHONE (Include Area Code) (508) 651-4238	22c OFFICE SYMBOL STRNC-YBH	

in both flavor and viscosity to decrease boredom and stimulate appetite. They also recommended smaller serving sizes since they could sip only for short periods of time. UF patients rated the liquid foods higher in flavor and preferred a higher viscosity. They reported that their physicians recommended straws not be used due to the potential for infection and damage due to sutures. All agreed that the concept of rehydrated powdered foods is appealing, while liquifying solid foods is not. All perceived a nutritional and convenience benefit to rehydrated foods.

[illegible]

PREFACE

Ten years ago, a deficiency in the diet of hospital patients who had subsisted on pureed or liquid-type diets was noted by the Office of the Surgeon General.^{1,2} One problem was due to the lack of variety in commercially available foods, which consisted mainly of a limited variety of flavored milkshake-type beverages, soups and purees. The other problem was the difficulty of preparing dental liquid diets in a conventional food service environment. Since most patients had to remain on these limited diets for extended periods of time, problems began to surface. Lack of variety caused patients to consume less and, thus, become malnourished.³

In response to the request of the Office of the Surgeon General,⁴ the Food Engineering Directorate was tasked to develop entrees, vegetables, starches and desserts for the new Walter Reed Hospital, Washington D.C., using a cook-freeze food preparation system. These entrees were to become part of a two-day menu. This system however, proved impractical for those hospitals that did not have a cook-freeze system.

The freeze-dried system had a much broader usage base and a two-day menu was developed. This advanced dental liquid diet was tested in a study involving 96 subjects in eight military hospitals. The diet, plus between-meal supplements, was evaluated for flavor, consistency, texture, ease of sipping, portion size, variety and overall acceptability. The subjects also compared the new diet with their current hospital diet. In addition, dieticians at each of the participating hospitals evaluated preparation time and ease of preparation. Consumption data was also collected and the nutrient intake compared to the Recommended Daily Allowances (RDA) in order to determine adequacy of the nutrients in the diet.⁵

In 1985, the Office of the Surgeon General requested that the menu be expanded to five days and a more cost effective method be developed.⁴ The freeze-dried method of producing dental liquids was costly due to the small number of producers and the length of time expended for production; hence the current method of dry blending products.

Qualitative data on these dry-blended products were collected in two focus groups from civilian subjects who had recent jaw surgery. This qualitative approach to data collection was used to evaluate the acceptability of various attributes of the foods to elicit reactions and uncover problems that subjects had with their postsurgery diets through group discussion.

ACKNOWLEDGEMENTS

The authors would like to give special thanks to Ms. Vickie Puopolo-Chipman, MPT at Martin J. Dunn, DMD, Inc., Brockton, Ma. and Ms. Judith Rosati with the office of Albert Carlotti, DDS, Warwick, R.I. for recruiting the subjects and coordinating the focus groups at the test sites. The authors would also like to thank Ms. Susan Erickson, project officer for the Dental Liquid Products (Food Engineering Directorate, Natick) for providing the products for the tests and shipping each of them to the test sites. Additional thanks go to Ms. Ruth Roth for her assistance before and during the groups and to Mr. Richard Walunas of Audio Visual for videotaping the sessions.

TABLE OF CONTENTS

	<u>PAGE</u>
PREFACE	iii
ACKNOWLEDGEMENTS	iv
INTRODUCTION	1
I. STATEMENT OF LIMITATIONS	1
II. SESSION I	2
III. SESSION II	6
IV. DISCUSSION	10
V. SUMMARY AND RECOMMENDATIONS	11
REFERENCES	13
APPENDICES	14
A. MODERATOR'S GUIDE: SCRIPT FOR LIQUID FOODS GROUPS	15
B. LETTER TO PATIENTS	19
C. LETTER TO ORAL SURGEONS	21
D. VOLUNTEER'S AGREEMENT	24
E. DISTRIBUTION LIST	26

THE EVALUATION OF NEW LIQUID FOODS VIA FOCUS GROUPS

INTRODUCTION

This report summarizes the key findings from two focus groups, conducted with past and present oral surgery patients who had intermaxillary fixation (wires surgically inserted in their jaws).

A. Purpose: The groups were conducted to obtain reactions of past and present surgically fixated patients to several newly developed dental liquids. These groups and others to be conducted in the future are expected to provide qualitative information to help produce a satisfactory menu of liquid foods on which surgically fixated patients can subsist for long periods of time with only minimal weight loss.

B. Methodology: Patients were recruited through the offices of oral surgeons who perform intermaxillary fixation for trauma or orthognathic deformities. The participants were required to be:

- * Past patients who had orthognathic intermaxillary fixation within the past year, but who were not presently wired

- * Patients who were presently surgically fixated for orthognathic (elective) surgery

Each session opened with a statement of purpose, ground rules, and a brief review of what was planned. After an introduction, a discussion about problems related to eating while surgically fixated ensued. A concept board with a photo of a solid meal and its liquid counterpart was shown to elicit reactions. Three "meals" were then served and were accompanied by rating sheets. Breakfast and dinner menus were served with the items identified by name. For lunch (Chicken BBQ, Delmonico Potatoes, Buttered Squash, Gingerbread), items were unlabelled and participants were asked to name the foods. Each menu consisted of four 2-3 oz. samples, served in clear plastic cups. Serving temperature was room temperature or hot (170 deg F), as appropriate for the food type.

Various issues such as flavor, texture, color, aroma, acceptability, food name, ease of sipping and serving size of meals were discussed. The sessions concluded with a discussion of the advantages and the disadvantages of the dental liquids compared to the foods normally consumed while surgically fixated.

I. STATEMENT OF LIMITATIONS

The Focus Group interview seeks to develop insight and direction rather than quantitatively precise measures. The following biases are inherent in this type of study are stated

to remind the reader that the data presented here cannot necessarily be projected to any wider population of jaw surgery patients.

Bias 1. Participants "self-select" themselves, i.e., they are those people who were available on the night a particular group was scheduled. They tend to be risk takers and may be somewhat more assertive, articulate and willing to express opinions in a group than nonparticipants.

Bias 2. Participants were not randomly selected, so each person in the pool of possible participants did not have an equal chance of being selected.

Bias 3. People in groups may respond differently to questions than if asked the same questions individually. They may agree to the opinions of a strong speaker, group leader or someone they perceive as "expert".

II. SESSION I

The first session was held on 20 October 1988 at the Cardinal Cushing Hospital Medical Building in Brockton, MA. Ten past patients were scheduled to participate, but only four attended. The participants were females who had intermaxillary fixation in the past year but did not have their jaws surgically fixated at the time of the focus group. They were between the ages of 21 and 47.

Information on each of the following areas will be presented with appropriate verbatim comments to illustrate particular points. Appendix A contains a copy of the discussion outline used in the session.

Key areas included in this section:

- A. Problems encountered with foods while surgically fixated
- B. Satisfaction/dissatisfaction with foods eaten while surgically fixated
- C. Reactions to concept board of new liquid foods with their solid counterparts
- D. Evaluations of representative Breakfast, Lunch and Dinner items served
- E. Dental Liquids vs. Liquid Diet when wired

A. Problems encountered with foods while jaw wired

One of the main concerns voiced by the majority was the fear of choking. Another concern of one of the respondents was having to consume so many liquids before being discharged from the hospital. Her concern reflects the common practice of oral surgeons who put their patients on a clear liquid diet for one week following intermaxillary fixation surgery to prevent dehydration and oral infection. They require their patients to drink 3500 cc of liquid daily before they can be discharged. Ingesting the liquid foods was difficult because they dribbled down the chin or out of the nose. Patients had to deal with constant hunger, rapid weight loss, discomfort while eating and frustration because they couldn't eat normally. The majority felt weak for the first few weeks due to the lack of food. Liquid food became lodged in the wires, and patients on clear liquids had to rinse frequently to try to remove the residue. One respondent complained of having to use her tongue to "suck in the food."

B. Satisfaction/dissatisfaction with foods eaten while surgically wired

Solid foods had to be liquified in a blender and watered down to make them thin enough to sip, resulting in bland, flavorless, and unsatisfactory meals. Lack of variety and food monotony were mentioned as problems. Two patients had trouble with the foods sticking on the inside of their mouth.

COMMENTS:

"I couldn't stand the Citroline; it was awful." "I got so hungry for meat, I put filet mignon in the blender. It was awful and had a grainy, terrible taste. It turned my stomach and got caught in my wires."

"I lived on mashed potatoes, tomato soup and cream of wheat...yuck!"

C. Reactions to new concepts

Based on the photo of a solid meal and its liquid counterpart, all agreed that the solid foods looked much better than the liquids. Appearance of liquified solid foods seemed to be a problem common to all liquid foods, since they felt the idea of blending whole foods into liquid form was unappetizing. They felt the liquid broccoli and cheese and the liquid chicken barbecue in the photo were not very appealing due to their bright color. However, one respondent, reflecting on her past experience, said, "You get so hungry, you get past the looks....desperate is the word." One respondent said she stopped being so fussy about the unappealing foods she was eating after the first week due to her extreme hunger.

D. Evaluations of Breakfast, Lunch, Dinner served

Breakfast:

APPLE CINNAMON FARINA - This received favorable comments for flavor and thickness. Two of the four respondents thought the sweetness level could be increased.

FRENCH TOAST - Most felt that the flavor was weak and that it tasted like batter. A few suggested adding vanilla and cinnamon. "It should be thicker...it's more filling when thicker."

Respondents stated that a liquid that has a counterpart in a solid food should be thicker than a typical beverage. They agreed that solid foods liquified in a blender should be thicker and those that are beverages should be thinner. They felt more comfortable with that. "Having some foods thick and some thin makes me feel like I'm getting more variety in a liquid diet."

STRAWBERRY-BANANA BREAKFAST DRINK - This was a hit. The respondents all enjoyed the fruity taste and agreed they would even drink it for a snack under normal circumstances. One felt she would make it slightly thicker.

COFFEE CAKE - Most felt it was just like real coffee cake. One suggestion was to make it thicker.

Respondents commented positively on the variety in thickness and sweetness levels among the breakfast foods.

Lunch:

CHICKEN BBQ - Most of the respondents felt the flavor could be less intense, with more chicken flavor and less barbecue flavor and a little less salt. Only one correctly identified the item as chicken; the others guessed "meat".

DELMONICO POTATOES - This was well liked; and all but one identified the item as potatoes with cheese. All agreed that it was too thick.

BUTTERED SQUASH - The consensus was that it tasted like squash, but it was too thick and difficult to sip. Two commented that if like squash, it was tasty. They recommended that the color be toned down. "It looks like mustard."

GINGERBREAD - All but one liked the flavor. Recommendations were to make it thicker, reduce the ginger and add more cinnamon.

Linner:

TACO GRANDE - This was not a hit! The majority felt the flavor was much too strong and the consistency too thin. They recommended using less spice; and more tomatoes and cheese. They all agreed the name was appropriate.

MEXICAN BEAN CASSEROLE - "This took my breath away!" All were in agreement that this was too spicy and too thin. They felt that since beans are thick, this should be also.

CREAMED CAULIFLOWER - Three out of four respondents liked it. They thought the color was natural, flavor was pleasant, the consistency was good, and the name was appropriate.

STRAWBERRY SHORTCAKE - The majority disliked it. They thought the flavor was too weak and the consistency too thin.

E. Dental liquids vs. liquid diet when wired

When asked to compare these new dental liquid foods to the liquid diet they were on when surgically fixated, the advantages of new dental liquids far outweighed the disadvantages. A comparison of the two follows.

DENTAL LIQUIDS	PREVIOUS LIQUID FOODS
1. Offer so much variety that you would not get sick of them.	1. Monotony of diet...no variety.
2. Easier to prepare since you know how much water to add.	2. Have to keep watering down; too dilute.
3. Foods have a good aroma and more flavor.	3. Foods get caught in wires.
4. More convenient to carry and prepare away from home.	4. Some foods gritty.
5. Smoother texture.	
6. Like having different colors for eye appeal.	

The respondents were told that in a hospital the new liquid foods would be served in 8 ounce portions, with a breakfast menu consisting of two items and lunch and dinner consisting of four items. When asked if they felt they could drink as much as 32 oz (947 cc) at a meal (32 oz x 3 meals = 2840 cc per day) the respondents said that would be too much and they would prefer to have one glass at a time, spread throughout the day.

One respondent in closing, made a positive remark about the dental liquids: "Food is a very important thing. When you're deprived of it, that's all you think about and the more time that goes by the worse it gets. If you could satisfy me with taste, I'd be happy."

III. SESSION II

Session II took place on 5 November 1988 at Miriam Hospital, Providence, R.I. The participants were 5 females, ages 14, 15, 23, 29 and 40. They recently had intermaxillary fixation and all but one were still in fixation. The participants' wires had been removed just a few days before the session. It was unclear in advance of the session how long the respondents would be able to talk without getting tired; however the session lasted two hours and the respondents were enthusiastic to the end. The discussion guide was essentially the same as for Session I except for the following modifications:

At the beginning of the session, the respondents were told to think about their favorite meal and then think of it in liquid form.

They were shown two concept boards: one containing a photo, showing the foods in powdered form and the steps in preparing them, and the other showing solid foods and their counterparts in liquid form.

They were asked what their expectations were before sampling each food.

The meals served were the same as in Session I, except for the following substitutions:

Green pepper & ham omelet replaced coffee cake at breakfast.

Cheeseburger replaced chicken barbecue at lunch.

Macaroni & cheese replaced Mexican bean casserole at dinner.

A. Problems encountered with present liquid foods while wired

All agreed that eating is a big problem due to the intermaxillary fixation. The respondents can't seem to get the foods fine enough without diluting them too much. Even then, pieces of food get caught in their wires. Because the wires are metal, they conduct heat and cold, which causes discomfort to the teeth when the foods are at extreme temperatures. Respondents had a problem with food dribbling out of their mouths and down their chins. A few said that everything seemed to taste metallic

due to the wires. The respondents agreed that the procedure of sipping their liquid foods takes so much effort and is so uncomfortable that they can only eat small amounts at a time. This causes constant hunger. Respondents all agreed that their teeth felt "soft" and hurt. One respondent's face was still swollen and she complained that she had to use her lips a lot in order to prevent the food from dribbling out of her mouth.

B. Satisfaction/dissatisfaction with present foods currently eaten

Some of the patients did not like to blend solid foods into liquid form, finding the process very unappealing. One said she would rather eat foods that were already liquid or semisolid such as applesauce, soups, etc. However, the others said it made no difference to them what they put in their blender as long as they could drink it. The reason for this attitude: Hunger.

Several respondents reported that preparing a meal was frustrating, because they had to keep adding water to the foods that they blended together, which resulted in watery and tasteless food. Most agreed that it was difficult to eat a lot of this liquid food at one time; it was more bloating and filling than the same amount of solid food without the added liquid. The lack of variety was dissatisfying to them. All reported that they were told by their doctors not to use straws, since the force of suction could cause the wires to move or could result in food being sucked into a wound, thereby producing infection. Patients said that they drank small amounts at a time from a glass or sipped it from a spoon. One said, "It would be great if you could find a cup with a rim around it to prevent food from dripping." They could not think of any other ways to make sipping easier.

C. Reactions to new concepts

The majority felt that the "real" foods in the picture looked more appetizing and that the liquids did not look like the real thing. They also commented that the liquid colors were too intense and therefore not tempting. During the actual taste test of the liquid foods the only negative comment about the color was in reference to the strawberry shortcake. The respondents agreed that it looked like chocolate milk and needed more red coloring to make it look more natural.

D. Reactions to concept of new liquid diet in powder form

Most felt the idea of having a variety of liquid foods in powdered form was appealing. Not only would the packet be convenient for easy storage but it would also allow them to take their meals with them away from home and prepare them easily.

The concept of adding water to a powder seemed more appealing than having to blend solid foods with water. Evidently the former is more familiar, since many "quick" foods are made this way. The respondents agreed that the powdered form would be more advantageous as they would know the exact amount of water to add for the proper dilution instead of guessing and overdiluting as they presently do. Also, they said that using the powdered form would result in more predictable serving sizes than liquifying a solid food. Finally, respondents felt that they would be sure to get adequate nutrition from the new product, whereas with their own liquified foods they were unsure whether this was the case. This view points out an important perceived benefit associated with the new liquid diet.

E. Evaluations of Breakfast, Lunch, Dinner Served

Two of the respondents had "splints" put under the wires when their jaws were fixated. This procedure is generally used when both lower and upper jaws are broken. The splints are made of plastic and resemble the pieces that are put in the mouths of football players or boxers to prevent damage to their teeth. The respondents with splints felt differently about the consistency of most of the foods than the others did. They said the food could not get through the teeth at all and went to the back of the mouth and into the throat. Therefore, they preferred a much thinner consistency.

Breakfast:

APPLE CINNAMON FARINA - The respondents expected more of an apple and cinnamon flavor. As served, the product was rather bland and thick. They recommended adding more apple, cinnamon and sugar. One respondent said: "I can't taste things because my tongue is trapped and the food never gets to touch it. You smell it and you know it's well spiced, but I think that since our tongues have all the sensitivity and it takes a while for the food to get to the tongue, I don't know if you ever get the full flavor."

FRENCH TOAST - The respondents expected a maple flavor since they all said they use maple syrup. They agreed the item was too bland; that it tasted more like a batter. They thought the consistency was good and recommended adding maple syrup, vanilla and cinnamon.

GREEN PEPPER AND HAM OMELET - "This tastes like it should." "I can still taste it." The respondents thought it had a lot of flavor and that the name was appropriate. They said the color was "okay" and two commented that they felt color was unimportant when you're very hungry.

STRAWBERRY BANANA BREAKFAST DRINK - Two respondents said they generally don't eat strawberries and one did not like the combination of bananas and strawberries together. Overall, it was not popular, but this seemed due to personal preferences.

The respondents agreed that consuming 16 oz for breakfast in one sitting was too much. They felt they would rather have several small meals throughout the day rather than consuming that much all at once.

Lunch:

CHEESEBURGER - Four respondents guessed that it was hamburger. Most thought it was too salty, tasted like beef bouillon and left a bitter aftertaste. They felt it needed more cheese. They all agreed that the consistency and color were good.

DELMONICO POTATOES - Three out of five liked the item. The respondents tasted more cheese than potato flavor and suggested adding more potato. They thought the consistency was too thick and that it was difficult to sip. They all thought the name was appropriate.

BUTTERED SQUASH - Three out of five did not normally eat squash but felt that the product was not unpleasant. They felt it was as close to the real thing as you could get. One liked the fact that it was a "single ingredient food as opposed to trying to put together so many different flavors." Three felt the consistency was too thick.

GINGERBREAD - The respondents all felt the name was appropriate. They were able to detect nutmeg, cinnamon, apple pie and pumpkin pie. They liked the flavor and felt that the consistency was good.

When told that a meal would consist of 32 oz for lunch, the respondents commented that this amount would be too much to consume at one time. They again stated that they would prefer to have small meals throughout the day.

Dinner:

TACO GRANDE - Three out of five liked it. Three respondents had eaten tacos before; the other two had not. The ones that had a positive response felt that it had a lot of flavor and wasn't bland. "Taste is important because you don't get to chew." One commented that it was slightly too spicy, but she doesn't normally eat spicy food.

MACARONI & CHEESE - Most of them liked this item moderately. They thought it was slightly too cheesy but was pleasant. The consistency was not a problem except for one respondent. She felt that it was too thick.

CREAMED CAULIFLOWER - Four out of five thought it tasted like cauliflower and the flavor was acceptable. One did not try it as she does not normally eat cauliflower. The two splinted respondents felt the consistency was too thick. They all agreed they would not eat a lot of this item at one time.

STRAWBERRY SHORTCAKE - The respondents were not too enthusiastic about this dessert. They felt it needed more strawberries, tasted milky and expected it to be red, not pink. They thought it looked more like chocolate milk. They said the consistency was very good.

For these respondents, the perceived advantages and disadvantages of the new foods compared to their present diet were as follows:

ADVANTAGES	DISADVANTAGES
1. More nutritious.	1. Not as tasty as real food.
2. Easier to prepare.	2. Rather drink "familiar" liquids like soups.
3. More flavorful, not watery.	3. Some of the foods are too thick.
4. Easier to sip.	
5. Smooth, not gritty.	
6. More appealing than liquifying solid food in a blender.	
7. More portable, can take it with you when you go out.	

At the close of the sessions, the respondents were shown the packets of foods and asked if they would buy them if they were available. Four out of five said they definitely would buy them.

IV. DISCUSSION

Although the total number of participants in the groups was small, some relevant and important information was generated in these focus groups. The surgically fixated patients pointed out that food generally tasted bland to them. It is possible that

the oral fixation and the insertion of splints prevents food from reaching all the receptors in the mouth, reducing the overall flavor intensity.

A difference was also noted between the two groups in their feelings about the thickness of the new dental liquids. In several cases, the unwired respondents felt the foods were too thin whereas the wired respondents were more satisfied with the consistency. The difference in flavor and texture perception between the two groups points out the importance of testing dental liquids with surgically fixated patients.

All present and former patients, especially those with splints, commented on the difficulty they had with consuming liquid foods. This suggests the need to investigate alternative food delivery systems to facilitate consumption of the liquids, especially since patients are not allowed to use straws.

During Session II, a discussion ensued about the perceived benefits of the powdered dental liquid foods. The respondents perceived them as more nutritious than their own liquid diet. Also, using a powder base is more appealing because it is similar to other types of food preparation where water is added. The concept of a liquified solid food is unappealing, and anything that can be done to reduce that association is likely to increase the acceptability of the liquid diet. One suggestion was to make more soups with the vegetables as a base, and to include the word "soup" in the name in order to take advantage of this familiar concept.

Finally, both groups agreed that the powdered foods would be much easier to prepare since individuals would know exactly how much water to add and how much liquid each packet would make.

V. SUMMARY AND RECOMMENDATIONS:

(1) Patients with wired jaws reacted differently to the newly developed, rehydrated, powdered, dental foods than patients with unwired jaws. The wired group found the foods tasted more bland, and they preferred a thinner consistency.

(2) Splinted patients want "thinner" (more watery) foods than unsplinted patients.

(3) Color of the foods was not an important issue, except for two foods: strawberry shortcake and buttered squash, due to the inappropriate color that was presented. Perhaps a less highly colored variety of squash should be used.

(4) Variety both in flavor of the foods and texture is important and better in the new diet.

(5) Foods that are normally in solid form should be as liquids slightly thicker. However, those persons wearing splints need all foods thinner.

(6) Beverages should remain thin.

(7) The amounts recommended for meals, i.e., 16 oz for breakfast, 32 oz for lunch and dinner are too much to drink all at once.

(8) Ingesting liquid foods of any kind is very difficult and messy.

(9) The concept of powdered foods that are prepared by adding water is appealing. Liquifying solid foods is not.

(10) The dental liquids have both a perceived nutrition and convenience benefit.

Based on this research the following recommendations are presented:

(1) More flavor should be added to the foods to make them more appealing to patients undergoing intermaxillary fixation, since they perceive many of the flavors as bland, except for Mexican items.

(2) Consider changing the preparation instructions for splinted patients to decrease the thickness of some of the foods.

(3) Investigate the use of a better food delivery system. According to several oral surgeons, the use of straws can cause infections to open wounds and damage the sutures.

(4) Marketing of these foods should stress: flavor, texture, convenience of carrying and ease of preparation away from home, and the completeness of nutrition.

(5) Focus groups with military patients whose jaws are fixated need to be conducted to compare the results with those already obtained.

REFERENCES

1. Dillingham, S. Army's Liquid Chow is Easier to Swallow. Insight, February 22, 1988.
2. DF, STRNC-AF, 21 January 21, 1985, Subject: "FY88 Requirements for DoD Food Nutrition Program." U.S. Army Natick Research, Development & Engineering Center.
3. Siegel, P.S., & Pilgrim, F.J. The effect of monotony on the acceptance of food. American Journal of Psychology, 1958, 71, 756-759.
4. Memorandum for Record, DoD, R&D Program, Requirement Technical Plan, 1 October 1985.
5. Edinberg, J., & Engell, D. Hospital liquid diet evaluation, two-day menu. Technical Report Natick /TR-89/010, September 1988.

APPENDICES

- A. Moderator's Guide: Script for Liquid Foods Groups .
- B. Letter to Patients
- C. Letter to Oral Surgeons .
- D. Volunteer Agreement

APPENDIX A.
MODERATOR'S GUIDE:
SCRIPT FOR LIQUID FOODS GROUPS

APPENDIX A
MODERATOR'S GUIDE:
SCRIPT FOR LIQUID FOODS GROUPS

I'm delighted to be here and I hope you are too. I'm Joan Kalick, a Home Economist with the Sensory Analysis Section in the Behavioral Sciences Division at NATICK RD&E CENTER. Some of you look curious and some nervous...Relax, sit back and enjoy. We're about to have an informal group discussion and a taste test about some new liquid foods that food scientists at NATICK have developed. Your reactions and opinions are extremely important to us. Having gone through the experience of having your jaws wired, you can share with us some of the experience that you encountered, and help us produce a new liquid diet for military personnel.

Before we begin, I'd just like to highlight some things that were mentioned on the Volunteer's Affidavit that you signed.....

1. I want to reassure you that there are no right or wrong answers.
2. All of your input is important.
3. Please speak one at a time and as loud as me so that the tape recorder will pick up your voices.
4. The reason that we're videotaping this session is to let the project officer view this session without distracting you. I also need to write a report and the tape takes notes for me.

Now I'd like you to imagine that your jaws are wired once again....I want you to list on the pad the three greatest problems you had after your surgery with your diet (either in or out of the hospital).

Please list them and turn the pad over.

Let's talk about them....why were they problems?

How satisfying were the foods that you had What did you eat?

Was variety an issue for you or did you stick with your favorites and not bother about variety?

Did you have a problem with preparation?

(MODERATOR: IDENTIFY MAJOR PROBLEMS AND PUT THEM ON THE FLI? CHART.

TALK ABOUT THE TROUBLESOME PRODUCTS.)

I'd like to introduce some breakfast items to you and have you taste each one and rate them on the questionnaire labelled for each food.

These items are.....Apple Cinnamon Farina, French Toast, Strawberry Banana Breakfast Drink, and Coffee Cake.

What do you think of it. Do the products fit the concept conveyed by the name?

Only two items are in a menu (16 oz) along with any other beverages.

(MODERATOR: SHOW THE PICTURE OF PRODUCT W/NATURAL FOOD.)

Let's discuss breakfast. How do you feel about drinking 16 oz for breakfast? This would be the amount for a typical breakfast. Imagine you'd be drinking 8 oz of each item.

By the way, these foods are made by adding the contents of a package into a blender and adding 8 oz of either hot or cold water and mixing at high speed for 1 minute. What do you think of that?

Please turn those forms over now and we'll have lunch. These foods are unlabelled. Please taste each sample (1,2,3,4) one at a time, call it what you think it is and write the name on the sheet. Then we'll discuss them. Taste them from top left to right then lower left to right. Let's talk about the top left first.

What do you think it was?

(MODERATOR: AFTER GIVING THE NAME ASK IF IT'S APPROPRIATE. REPEAT FOR THE OTHERS.)

(MODERATOR: LIST ON THE FLIP CHART.)

What do you think of this combination? How do you feel about drinking 32 oz for lunch?

(MODERATOR: DISCUSS INDIVIDUAL ATTRIBUTES.)

Any problems identifying the taste of the products?

Last but not least, this is dinner.

(MODERATOR: LIST ON THE FLIP CHART.)

What do you think of this menu?

Please rate each food starting with the top left then right and bottom left then right and put your ratings on the interviews provided. Then we'll discuss them.

Do you feel that it's important to have a variation in the consistency of the product so that the sipping effort is different? Is that important to you?

What makes for variety in a liquid diet?

Are the product names helpful or do they give you false expectations?

How do these products address the problems you had when you were eating when your jaws were wired?

Can you think of any disadvantages of these products compared to the old liquid diet? Would you want any of these products for regular meals, like snacks when your jaws were not wired?

Was grittiness a problem for you with any of these new liquid foods?

How easy were they to sip?

Did any of you experience the problems before?

Do you have any other comments to make?

I want to thank you all for coming. I hope you've enjoyed this experience.

APPENDIX B. LETTER TO PATIENTS



DEPARTMENT OF THE ARMY
U.S. ARMY TROOP SUPPORT COMMAND
NATICK RESEARCH, DEVELOPMENT AND ENGINEERING CENTER
NATICK, MA

REPLY TO
ATTENTION OF

1 August 1988

Address

Dear

We hope all is well with you following your treatment of jaw surgery. As you might remember there was not much variety in the choices of foods that you had to eat during that time, other than milkshakes, soups, and baby foods. Due to recent developments in the area of liquid foods at the U. S. Army NATICK Research, Development and Engineering Center, Natick, MA., other patients going through the same ordeal may in the future be selecting their meals from a much larger variety of foods. A typical meal might consist of mashed potatoes, buttered corn, chicken barbeque and strawberry shortcake. All of the items are nutritionally balanced, flavorful, and approved by the Food & Drug Administration.

We invite you to participate in evaluating these new foods in the near future. Since you are part of a very select group of patients who have had experience with eating after jaw surgery, your input is extremely important to our study. Only you can appreciate the problems facing someone when they must eat only liquid food. By joining others like yourself in an interesting, informal discussion, you will be making an important contribution which will be beneficial to jaw surgery patients or to anyone who may require a liquid diet. With your help, we can make this happen!

The session will be held in the early evening to make it more convenient for you, and will last approximately 1-1/2 to 2 hours. It will take place at the Cardinal Cushing Hospital. Refreshments will be served and you will receive \$35 for your participation. Please complete and mail back to us the short form attached. For your convenience we have enclosed a postage paid reply envelope. When I receive your reply I will contact you to provide you with further details and directions.

Thank you in advance for your interest!

Encl: 1

JOAN KALICK, Home Economist
Food Systems & Human Factors Branch
Behavioral Sciences Division
Science & Advanced Technology Directorate

APPENDIX C. LETTER TO ORAL SURGEONS



DEPARTMENT OF THE ARMY
U.S. ARMY TROOP SUPPORT COMMAND
NATICK RESEARCH, DEVELOPMENT AND ENGINEERING CENTER
NATICK, MA

REPLY TO
ATTENTION OF

29 June 1988

Address

Dear Sal :

Would you like to be able to recommend a variety of tasty and appetizing liquid meals to sustain the nutritional requirements of your patients during their recovery period after you have wired their jaws? You may be able to do so in the near future, because commercial companies have expressed an interest in producing these products and making them available to the public.

The U.S. Army Natick Research, Development and Engineering Center in Natick, MA., has developed such advanced food concepts as freeze drying; NASA space foods; retort pouches (3-ply aluminum and mylar packets of prepared meals that can last years without refrigeration); and shelf stable tray cans containing bulk meals. Recently it has developed a new hospital advanced liquid diet that includes approximately forty powders that, when reconstituted with water tastes like components of a normal meal. A typical dinner includes delmonico potatoes, buttered squash, chicken pot pie, chocolate mocha cake and orange milkshake.

All meals are nutritionally balanced. The menus provide approximately 2200 calories and 74 grams of protein a day. They are individually packaged in dehydrated form. Preparation is easy. The powder is poured into a blender, and mixed with 8 oz of hot or cold water (depending upon the food). All products have been prepared with commercial ingredients and are processed and packaged according to standard procedures. The food conforms to all provisions of the Federal Food, Drug and Cosmetic Act and regulations.

Since this is such a specialized diet, we need input and opinions from people who have undergone or are undergoing jaw wiring due to trauma or orthognathic deformities currently or within the past year. They, more than anyone, will appreciate the need for this product. If you have former patients who meet this criteria NATICK would like to have them participate in informal discussions to evaluate some products and give their opinions of them. Sessions will last approximately 1 1/2 to 2 hours and be conducted here at Natick RD&E Center or at other sites to be specified. Refreshments will be served and respondents will receive \$35 for their participation.

Due to time constraints, we need to schedule the groups as quickly as possible; therefore, I would appreciate if you would mail the invitation letter to qualified patients without delay. If you have any questions, please contact Joan Kalick or Dr. Armand Cardello at 651-4976. To expedite the process, I have enclosed invitation letters and stamped envelopes for you to mail to your patients, with an acceptance memo and stamped envelope for your patients to return to me if they are interested in participation in the study. For your information I have also enclosed, (1) one of the articles that appeared recently in the Middlesex News pertaining to the liquid diet (Attachment 1); (2) a brief description of the issues that will be discussed during the focus group (Attachment 2); and (3) pamphlets about NATICK R, D, & E Center for you and your patients.

Your contributions are extremely important to the success of this study and we greatly appreciate your cooperation.

Joan Kalick, Home Economist
Food Systems Human Factors Branch
Behavioral Sciences Division
Science & Advanced Technology Directorate

Enclosures: Patient letters w/envelopes (15)
Attachment 1-Newspaper article (1)
NATICK pamphlets (16)
Attachment 2-Description of issues in group
discussion

APPENDIX D. VOLUNTEER'S AGREEMENT

DATA REQUIRED BY THE PRIVACY ACT OF 1974 (5 U.S.C. 552a)

1. AUTHORITY: Title 10 U.S. Code Section 3012
2. PRINCIPAL PURPOSE(S): Information provided in this questionnaire will be used to form a pool of volunteer subjects interested in participating in sensory tests of foods and beverages, studies of eating habits and evaluations of test methods.
3. ROUTINE USES: Information provided in the questionnaires will be used to call individuals for participation in specific studies. Access to the information furnished will be limited to authorized personnel. Reports which include information from the questionnaire or judgements given in the subsequent food tests will include statistical data only. Individuals who participate will not be identified with such data.
4. MANDATORY OR VOLUNTARY DISCLOSURE AND EFFECT ON INDIVIDUAL NOT PROVIDING INFORMATION: Participating in these studies is voluntary. For you to participate in these studies, the questionnaire must be returned with all questions completed.

PLEASE CHECK ONE BOX BELOW:

1. ☐ YES, I am interested in participating in a group discussion concerning the new liquid foods.
2. ☐ NO, I am unable to attend a group discussion concerning the new liquid foods.
3. ☐ I cannot attend at present but would be interested in the future.
4. I had my jaws wired because of (CHECK ONE)

☐ trauma (accident)
☐ orthognathic surgery (cosmetic)
☐ other
5. My surgery took place: (CIRCLE ONE)
Within the past:
2 months; 6 months; year; 1-3 years; 3 years or longer
6. NAME: _____
7. ADDRESS: Street _____
City/Town _____
State _____ Zip Code _____
8. I can be reached between the hours of _____ at
Home Telephone No. _____ or Work Telephone No. _____

Thank you for filling in this questionnaire.

Joan Kalick (508) 651-4976 or (508) 651-5516

TECHNICAL REPORT DISTRIBUTION LIST

Number of Copies

Commander U.S. Army Natick Research, Development and Engineering Center ATTN: STRNC-YBH STRNC-WTP	50 4
Martin J. Dunn, D.M.D., Inc. Cardinal Cushing Hospital Doctors' Office Building 830 Oak Street, Suite A Brockton, MA 02401	1
Albert Carlotti, D.D.S. 243 Jefferson Blvd. Warwick, R.I. 02888	1
Lt. Col. Patterson Chief, Education & Research Division Walter Reed Army Medical Center Nutrition Care Directorate Washington, D. C. 20307-5001	1
Ms. Bernice Dorse Director, Dietetic Service Department of Veterans Affairs 810 Vermont Ave., NW Washington, D.C. 20420	1
Ms. Gloria Stables Nutrition Research Specialist National Institute of Health Building 10 Room BIS-234 Bethesda, MD 20892	1
Major Chiang Tripler Army Medical Center Nutrition Care Division Wing 2A Hawaii, 96859	1
Technical Library	6